

# Notice of Allowability

Application No.

09/761,921

Examiner

Jeffrey R. West

Applicant(s)

SCOTT, GARY W.

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## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the After Final Amendment filed February 17, 2004.
2. ☒ The allowed claim(s) is/are 1-44.
3. ☒ The drawings filed on 06 May 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

## **DETAILED ACTION**

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Mr. Stephen G. Rudisill on March 18, 2004.
3. The application has been amended as follows:
  - In claim 17, line 12, "in the presence of said parallel fault" has been deleted.
  - In claim 17, line 14, "endpoint." has been changed to ---endpoint during said parallel arcing fault between said current sensor and said mutually canceling insertion impedances---.
  - In claim 35, line 6, "endpoint and a second endpoint;" has been changed to ---endpoint and a second endpoint, thereby defining a series fault detection zone between endpoints where the two conductors are electrically connected together;---.
  - In claim 35, line 10, after "load conductors," ---thereby defining a parallel fault detection zone between said current sensor and said balancing core,--- has been added.

In claim 38, line 7, "endpoint;" has been changed to ---endpoint, thereby defining a series fault detection zone between endpoints where the two conductors are electrically connected together;---

In claim 38, lines 8-9, "providing balanced insertion impedances at said second endpoint in said pair of conductors to enhance current unbalance detection during said parallel arcing fault;" has been deleted.

In claim 38, line 11, "of parallel conductors; and" has been changed to ---of parallel conductors; providing balanced insertion impedances at said second endpoint in said pair of conductors to enhance current unbalance detection during said parallel arcing fault between said current sensor and said balanced insertion impedances; and---.

In claim 39, line 1, "A system of claim 38" has been changed to ---A system of claim 1---.

The following new claims have also been added:

41. A method of claim 17 wherein said electrical circuit supplying electrical power to a load is installed in an aircraft.

42. A method of claim 41 and further wherein a conductive frame of said aircraft provides a neutral current return connection.

43. A method of claim 38 wherein said electrical circuit supplying electrical power to a load is installed in an aircraft.

44. A method of claim 43 and further wherein a conductive frame of said aircraft provides a neutral current return connection.

4. On March 17, 2004, Mr. Rudisill also indicated to the Examiner that the Commissioner is authorized to deduct any additional fees required for the additional claims from Jenkins & Gilchrist, P.C. Deposit Account No. 10-0447, Order No. 47181-00193USP1.

***Allowable Subject Matter***

5. The following is an examiner's statement of reasons for allowance:

U.S. Patent No. 5,986,860 to Scott discloses a method and corresponding detection system for detecting series and parallel arcing faults in a defined zone of an electrical circuit supplying electrical power to a load (column 2, lines 60-64) comprising splitting a conductor in each said defined zone into a single pair of substantially identical parallel insulated conductors, thereby defining a detection zone comprising the length of said parallel conductors between terminating end points where the two conductors are electrically coupled together, providing a current sensor (i.e. toroidal transformer current sensor) operatively associated with each said pair of parallel conductors, and configuring and arranging the current sensor such that the current sensor produces a signal representative of a difference in the current flow in the two conductors (column 3, lines 25-40 and Figure 4). Scott also discloses that the current sensor comprises a  $di/dt$  (i.e. time derivative of current)

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air core toroid (column 10, lines 26-29), a figure-8 shaped core (column 9, lines 6-11), or at least a magnetic core, provided with a wound coil, coupled with the conductors in such a way that the currents travel in opposite directions, and therefore it is considered inherent that the magnetic fields will also oppose each other (column 8, lines 35-41).

Scott discloses an arc fault detector, operatively coupled with the current sensors, that produces a signal indicating an arc fault which is supplied as a trip signal to trip a circuit breaker (column 7, lines 23-41), a RC shunt filter to mask the effects on  $di/dt$  due to different load power factors (column 10, lines 53-63), and an over-pressure relay to detect faults to ground (column 12, lines 48-52). Scott also discloses that during differential phase current arc detection the detection zone is defined by a pair of identical parallel insulated conductors that each carry a load current (column 8, lines 23-41).

U.S. Patent No. 3,857,069 to Howell teaches a fault interrupter circuit comprising two parallel line and neutral conductors passing through a differential current transformer and a second auxiliary/balancing core (column 4, lines 9-24) wherein the auxiliary/balancing core provides a detectable current unbalance in the presence of a parallel fault by inducing signals (column 3, lines 12-20) that cancel impedances in the parallel conductors (column 3, lines 21-31 and column 8, lines 64-68).

While the invention of Howell does disclose many additional features of the instant invention, as pointed out in Applicant's arguments and indicated in a

declaration by Applicant, the invention of Howell requires both a neutral ground wire and a load wire and without the additional circuit elements and neutral wire, the invention of Howell would have no application and thus could not be combined with the invention of Scott. Similarly, while the invention of Howell does teach a balancing core for addition to the system of Scott comprising a current sensor associated with a pair of parallel load conductors, Howell does not specify that the balancing core be operatively associated at a second endpoint or that the zone between the two endpoints defines a series fault detection zone and the zone between the current sensor and the balancing core define a parallel fault detection zone.

Therefore, none of the cited prior art teaches or suggests, in addition to the other claimed limitations for a fault detection system/method for detecting both series and parallel arcing faults, a single pair of substantially identical parallel insulated load conductors, electrically coupled at a first endpoint and a second endpoint defining a series fault detection zone, a balancing core/mutual canceling impedance insertion point operatively associated at the second endpoint with a current sensor operatively associated at the first endpoint, thereby defining a parallel fault detection zone between the current sensor and the balancing core/mutual canceling impedance insertion point, as required in independent claims 1, 17, 35, and 38.

The following references are also noted as being pertinent to the examination of the application:

U.S. Patent No. 6,532,140 to McMahon teaches an arc-fault detecting circuit breaker system including an impedance optionally inserted into an output line to act as a sensitivity trigger point, but does not teach or suggest, in addition to the other claimed limitations for a fault detection system/method for detecting both series and parallel arcing faults, a single pair of substantially identical parallel insulated load conductors, electrically coupled at a first endpoint and a second endpoint defining a series fault detection zone, a balancing core/mutual canceling impedance insertion point operatively associated at the second endpoint with a current sensor operatively associated at the first endpoint, thereby defining a parallel fault detection zone between the current sensor and the balancing core/mutual canceling impedance insertion point.

U.S. Patent Nos. 6,339,525, 6,128,169, and 6,407,893 to Neiger et al. teach arc fault detection circuits including the addition of impedances through specified circuits and/or impedance beads, but do not teach, in addition to the other claimed limitations for a fault detection system/method for detecting both series and parallel arcing faults, a single pair of substantially identical parallel insulated load conductors, electrically coupled at a first endpoint and a second endpoint defining a series fault detection zone, a balancing core/mutual canceling impedance insertion point operatively associated at the second endpoint with a current sensor operatively associated at the first endpoint, thereby defining a parallel fault detection zone between the current sensor and the balancing core/mutual canceling impedance insertion point. Further, similar to the invention Howell, the inventions of Neiger

requires a neutral line and without the neutral line, the inventions of Neiger would have no application and thus could not be combined with the invention of Scott.

U.S. Patent No. 6,362,629 to Parker et al. teaches electric arc monitoring systems but does not teach, in addition to the other claimed limitations for a fault detection system/method for detecting both series and parallel arcing faults, a single pair of substantially identical parallel insulated load conductors, electrically coupled at a first endpoint and a second endpoint defining a series fault detection zone, a balancing core/mutual canceling impedance insertion point operatively associated at the second endpoint with a current sensor operatively associated at the first endpoint, thereby defining a parallel fault detection zone between the current sensor and the balancing core/mutual canceling impedance insertion point.

U.S. Patent No. 6,504,692 to Macbeth et al. teaches an AFCI device which detects upstream and downstream series and parallel arc faults but does not teach, in addition to the other claimed limitations for a fault detection system/method for detecting both series and parallel arcing faults, a single pair of substantially identical parallel insulated load conductors, electrically coupled at a first endpoint and a second endpoint defining a series fault detection zone, a balancing core/mutual canceling impedance insertion point operatively associated at the second endpoint with a current sensor operatively associated at the first endpoint, thereby defining a parallel fault detection zone between the current sensor and the balancing core/mutual canceling impedance insertion point. Further, the invention of Macbeth requires a neutral line.



6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

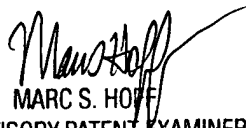
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March 18, 2004

  
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